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| Pairwise Alignments |  | Week 3 - Tuesday  **Activity A (concepts)**  **Activity B (de novo)** |
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| Overview Understand the relationships between sequences and the complexities in quantitation of pairwise alignments. Learning Objectives  * Dot plots and windows * Matches, mismatches and gaps * Scoring aligned sequences using different schemes  Activity & Description (A) Demo the comparison of a single set of two simple “sequence” words in a dotplot using paper and pencil. Then try a more complex comparison with attention to specific pertinent issues.  Students will perform dotplot analysis of 2 DNA sequences (see handout). Each group will consider strategies for addressing one of several different questions that routinely emerge in sequence analysis: (1) noise (2) distinguishing the “best” of several possible alternative alignments (3) repeats within a sequence. Exercise will be repeated with actual DNA and/or protein sequences at various dotplot web servers. Activity & Description (B) Develop an alignment and scoring system for pairwise sequence alignment that accounts for matches, mismatches and gaps.  Students conceptualize on paper a method for finding the optimal alignment between two DNA sequences that accounts for matches, mismatches and gaps. The method should include a scoring system by which the quality of different alignments can be compared. Groups will describe the alignment strategy and scoring scheme using the white boards. Feedback & Discussion Feedback (A): Various solutions will be projected using ELMO for paper answers or student computer projection (SCP) for online answers. Feedback (B) Groups will present a scoring scheme and briefly discuss its strengths and weaknesses. A meta-table will be constructed to allow the class to evaluate what methods work best. A list of required attributes for a scoring system will be generated on the board as the table is fleshed out. | Logistics  |  |  |  | | --- | --- | --- | |  | A | B | | Group Size | 3 | 3 | | Group Formulation | Any | Any | | Group Structure | Jigsaw | Jigsaw | | Seating/Computers | 3 | 3 | | Challenge/Room | 3 | single | | Presentation | White | Projected |  Student Assessment  |  | | --- | |  |  Workshop Assessment  |  | | --- | |  |  Links  |  | | --- | | <http://myhits.isb-sib.ch/cgi-bin/dotlet>  <http://www.vivo.colostate.edu/molkit/dnadot/> | |